Uncrewed Aircraft Systems: CTAN alignment with the Tech Prep Air Transportation Pathway in the Career Field Technical Content Standards of the Ohio Department of Education. (ODE course: 177024)

Semester Credit Hours: 3

Course Description: The Uncrewed Aircraft Systems (UAS) course will provide an opportunity to learn about careers utilizing UAS, exploration of industries where UAS can be utilized, and the opportunity to earn a FAA Part 107 Remote Pilot certificate.

- **Advising Notes:** Must access credit within 3 years of program completion or within currency of certificate.

Learning Outcomes **The student will be able to:**	**Outcomes and/or Competencies in ODE's REVISED Career Field Technical Content Standards**
1. Demonstrate a basic understanding of weather theory, hazardous weather situations, wind shear avoidance, and the procurement and use of graphical and textual weather products in order to identify current conditions and short-term forecasts.	7.5.5 Describe weather patterns and their impact on airport operations. 7.6.3 Explain the effects of temperature on weather. 7.6.6 Identify wind patterns based on weather systems. 7.6.11 Describe the types, conditions and factors of turbulence. 7.6.12 Describe the types and impact of thunderstorms, tornados, microbursts and hurricanes. 7.6.13 Describe wind and wind effects (i.e. crosswind, tailwind, windshear, mountain wave). 7.6.9 Describe weather system formation, including air masses and fronts. 7.11.3 Describe weather and environmental obstructions to visibility (e.g., smoke, haze, volcanic ash). 7.11.5 Describe potential flight hazards
2. Demonstrate basic knowledge of the Federal Aviation Regulations that relate to Remote Pilot in command privileges, limitations, and flight operations.	7.1.5 Describe the role and function of the Federal Aviation Administration (FAA). 7.9.1 Describe regulatory requirements for certification, rating, inspection, reporting and compliance for small-unmanned aircraft systems. 7.9.2 Describe registration requirements for small-unmanned aircraft systems. 7.9.3 Describe operating rules for small-unmanned aircraft systems. 7.11.1 Describe pilot qualifications.

3. Demonstrate the ability to interrupt aeronautical charts in order to identify airspace classification, airport locations, obstructions, and other hazards that may affect a UAS flight	7.1.9 Describe classes of airspace and associated requirements and limitations. 7.5.1 Describe the different types of controlled and uncontrolled airports within the United States. 7.5.2 Differentiate between towered and non-towered airports. 7.11.6 Describe the Notice to Air Missions (NOTAM) system and its use. 7.11.8 Define and describe piloting requirements for special use airspace (SUA), special flight rules areas (SFRA), temporary flight restrictions (TFR), and other airspace areas.
4. Identify the need for permission to fly in certain types of airspace and be able to utilize the appropriate systems to obtain those permissions	7.13.2 Determine right of way and describe minimum safe altitude rules.
5. Recognize when a waiver is needed for a flight, and understand the process to seek a waiver from the FAA	7.9.5 Describe small-unmanned aircraft waiver policy and requirements. 7.13.20 Analyze the challenges of night operations.
6. Demonstrate an understanding of the aerodynamics that allow a UAS to fly, and how the shape and size of a UAS can change aerodynamic elements; identify sensor types and capabilities	7.4.2 Describe the forces of flight and the three axes of motion. 7.4.3 Define Newton's Laws of Motion and Bernoulli's Principle. 7.4.4 Identify the parts of an airfoil and describe how an airfoil works. 7.4.5 Describe how aircraft configuration affects performance. 7.4.6 Discuss the role of thrust and the relationship between lift and drag.
7. Demonstrate a basic knowledge of the performance limitations of UASs, and how to properly plan and conduct a flight within those limitations (weight and balance)	7.4.9 Describe the effects of loading, weight and balance on center of gravity and aircraft performance. 7.4.10 Describe the design and power features that affect aircraft stability, performance and limitations. 7.4.16 Define load factor and G-forces. 7.9.4 Describe operating limitations for small-unmanned aircraft systems. 7.11.9 Calculate performance and limitations. 7.11.10 Determine performance and limitations by the use of charts, tables, and data.

	7.11.11 Describe atmospheric conditions affecting performance. 7.11.12 Describe how pilot technique and airport environment affect aircraft performance and limitations. 7.14.14 Describe characteristics and potential hazards of batteries or other fuel sources.
8. Identify when crew resource management (CRM) and single pilot resource management (SRM) is essential to a flight, and describe the elements of effective CRM and SRM, including proper radios phraseology.	7.7.7 Describe radio communication, phraseology and light signals. 7.9.6 Determine required crew roles (CRM, SRM) 7.9.7 Describe the purpose of visual observers, control stations and autonomous operations. 7.9.8 Describe pre-flight, in-flight and post-flight communications procedures.
9. Describe how safe, effective decisions pertain to a UAS flight, and how hazardous attitudes can degrade safety; ADM, PAVE, IM SAFE	7.8.2 Identify hazardous attitudes of flight. 7.8.6 Describe the decision making process in flight and steps to break the chain of poor judgement. 7.14.1 Describe emergency operations. 7.14.4 Describe systems and equipment malfunctions. 7.14.15 Describe loss of aircraft control link and fly-a-ways. 7.14.16 Describe loss of Global Positioning System (GPS) signal during flight and potential consequences
10. Demonstrate an understanding of the UAS industry and how their inclusion across multiple industries can lead to career opportunities	1.1.1 Identify the knowledge, skills and abilities necessary to succeed in careers. 1.1.2 Identify the scope of career opportunities and the requirements for education, training, certification, licensure and experience. 1.6.1 Identify business opportunities.
11. Describe the ability to effectively pilot a UAS, and the process involved to initiate, conduct and terminate the flight safely	7.11.14 Perform and analyze a preflight assessment. 7.11.16 Demonstrate proper engine starting. 7.11.18 Perform a before takeoff check. 7.12.1 Describe takeoffs, landings, and go-arounds. 7.12.2 Demonstrate a normal takeoff and climb. 7.12.3 Demonstrate a normal approach and landing. 7.12.10 Demonstrate post-flight procedures. 7.14.2 Demonstrate emergency descent.

12. Describe a basic understanding of preflight inspection, maintenance, and troubleshooting	7.11.2 Explain airworthiness requirements. 7.11.13 Describe operation of systems. 7.11.14 Perform and analyze a preflight assessment. 7.14.14 Describe characteristics and potential hazards of batteries and other fuel sources.